using refractive index profile dependent attenuation of guided modes passing transitions between two different segments as a consequence of a field profile change induced power conversion to radiation modes; and

measuring the light propagation in the direction of the guided modes along a predetermined arbitrary length distribution to determine a value of said external physical parameter or chemical component, and in case of intensity modulation, to use said value to control the ratio between the amount of light entering the activable lightguide device in the form of one or more guided modes and the amount of light leaving the activable lightguide device in the form of one or more guided modes and the amount of light leaving the activable lightguide device at the exit in the form of similar guided modes.

Claim 14. (previously amended) A method as claimed in claim 25, wherein said activable light guide device comprises a light guide channel including an inclusion layer and/or a light transmitting layer of an electro-optical material, wherein, in order to obtain light modulation, segments of one type are activated by means of an electrical potential difference between two electrodes patterned in an electrically conductive intermediate layer on either side of the light transmitting channel.

Claim 15. (previously amended) A method as claimed in claim 25, wherein use is made of an inclusion layer and/or a light transmitting layer comprising a thermo-optical material and wherein segments of one type are activated by means of an electrical current driven through an electrical conducting intermediate layer introducing a segment pattern corresponding with a predetermined pattern of segments activated by the external physical parameter or chemical compound.

Claim 16. (previously amended) A method as claimed in claim 25, wherein the integrated optical light guide device is provided with a channel type light guide and in that the activable element comprises two types of segments, the channel widths of the two segment types being adapted to each other to obtain a maximum guided mode transmission for predetermined value of the physical parameter or chemical compound.

Claim 17. (previously amended) A method as claimed in claim 25, wherein the light guide device is constructed as a quasi-digital sensor showing a large number of segments in order to obtain a narrow transmission peak around a predetermined value of the physical parameter or chemical compound its specific value being a function of the actual value of said physical parameter or chemical compound.

Claim 19. (previously amended) A method as claimed in claim 25, wherein the material and/or the refractive index profiles of relevant types of segments are adapted to each other to enable wavelength sensitive measurements by measuring the light emitted from different locations of the light guide device enabling determination of a power spectrum of the transmitted light.

Claim 20. (previously amended) A method as claimed in claim 25, wherein said activable light guide device comprises two types of segments S1 and S2, wherein S1 is activated by a quantity A and S2 is activated by a quantity B different from A and wherein S1 and S2 are incorporated in a feedback circuit generating, based on a criterion of a constant transmission by the activable light guide device, the relative index profile of S2 is maintained at a value equal to that of the refractive index profile of S1 by applying a suitable value B, to correlate the quantity A with a set value of quantity B.

Claim 21. (currently amended) An integrated optical lightguide device comprising:

an optical lightguide device having at an entrance side provided with a light source providing light of arbitrary wavelength and at an exit side provided with a light detector; and

along a direction of light propagation, providing several types of segments spaced in a non-periodic manner, each type of segment showing a different refractive index profile, wherein the refractive index profile of one or more types of activable segments depends on the value of an external physical parameter or chemical compound.

Claim 22. (previously amended) An integrated optical light guide device as claimed in claim 21, wherein said activable light guide device comprises two types of segments and wherein formation of segments is realized by means of a local physical or chemical treatment of an inclusion layer comprising a material activable by said external physical parameter or chemical compound.

Claim 23. (previously amended) An integrated optical light guide device as claimed in claim 21, wherein the activable light guide device includes a segmented, strip-loaded type channel light guide, wherein both the channel formation and the formation of segments is realized by a local physical treatment of an originally uniformly applied homogeneously activable inclusion layer.

Claim 24. (previously amended) An integrated optical light guide device as claimed in claim 21, wherein an inclusion layer and/or a light transmitting layer comprise an electro-optical material, in which layer local segment forming activation is realized by means of an electrical potential difference to be applied between a first electrically conducting layer

C1 cont

deposited on a first side of said electro-optical layer, and a second electrically conducting layer deposited on an opposite side of said electro-optical layer in which layer an electrode pattern is formed corresponding to a predetermined segment pattern.